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Effects of Various Ages of Weaning on Growth Characteristics, Survival Rate and Some Body Measurements of Awassi Lambs

[1]Vecihi Aksakal, [2]Muhlis Macit and [2]Nurinisa Esenbuga
[1]Kelkit Aydin Dogan Vocational School, Gumushane University,
Kelkit, 29600, GumuShane, Turkey
[2]Department of Animal Science, Faculty of Agricultural,
Ataturk University, 25150, Erzurum, Turkey

Abstract: This study aimed to investigate the effect of various ages (45, 60 and 75 days) of weaning on growth, survival rate and some body characteristics in Awassi lambs. Following weaning, the lambs were separated from their dams and taken to the pasture and were fed with concentrate including 15.3% crude protein in the evenings in addition to the pasture. The live weights and daily weight gains of the lambs were determined by weighing at 14 days intervals starting from day 45 till the end of pasture. Five females from each group were used in the determination of body measurements. In the study, in the lambs weaned at the age of 45 (group I), 60 (group II) and 75 (group III) days old; birth weight and live weights on days 45, 60, 75, 120 and 210 (end of pasture) were calculated on average as 4.58, 11.58, 13.95, 15.95, 21.54 and 34.44 kg, respectively and in the significance checks performed, it was identified that there was no significant ($p<0.05$) difference between the groups except for the day 210 live weight. There was not any difference observed between the groups in terms of Daily Live Weight Gain (DLWG). It was identified that the effect of the age of dam on live weight in lambs was insignificant in all periods that the effect of type of birth was very significant ($p<0.05$) except for the day 120 live weight and that the effect of sex was significant ($p<0.05$) in birth, day 60, 75 and 210 weights and very significant ($p<0.01$) in day 120 live weight. On looking at the survival rate characteristics, it was observed that this was lower in the group weaned at 45 days old on days 120 and 210 at a statistically significant ($p<0.05$) level compared to the other two groups. Furthermore, it was identified that singletons exhibited a higher survival rate at a statistically very significant ($p<0.01$) level compared to twins. The effect of weaning at various ages on the body measurements was found to be insignificant except for the chest width measured on day 210. Consequently, it may be said that taking into consideration the live weight gains and survival rate characteristics of Awassi lambs, the most suitable weaning age may be arranged as 60 days old.

Key words: Awassi, lamb, weaning age, growth, survival rate, body measurements

INTRODUCTION

Turkey, despite being one of the leading countries in the world with its 25 million sheep assets, has been experiencing a rapid decline in its sheep assets in recent years. The number of sheep, which was 40.5 million according to year 1990 statistics, has fallen down to 25 million today (Kaymakci, 2006). In this study, factors such as pasture areas shrinking in favor of industrial plants agriculture, the sheep species being unable to keep up with the expansion of intensive farming and the ongoing agricultural policies being manipulated by foreign monopolies in particular and thus, animal product designs being altered, have played a significant role (Kaymakci, 2006).

The Eastern Anatolia rsegion, which has large meadowlands, due to both its high altitude and its rugged, sloping and mountainous topographical structure, possesses characteristics, which are more suitable for sheep farming among various animal production sectors. Because sheep are frugal animals, which are easy to keep and feed, resilient to hot and cold weather and disease and can be raised cost free or at little cost in almost all operation conditions (Macit and Aksoy, 1996).

Corresponding Author: Vecihi Aksakal, Kelkit Aydin Dogan Vocational School, Gumushane University, Kelkit, 29600, GümüShane, Turkey

Today in sheep farming, a large part of the economic income is based on meat production. Consequently, it is observed that studies aiming to increase lamb productivity and growth performance in lambs, which are the main source of meat production in sheep farming, have intensified (Ozcan *et al*., 2001).

Although, increasing milk productivity in sheep is dependent upon improving the feeding conditions, it can also be achieved by extending the milking duration. There are various methods for extending the milking duration. The most important ones among these are separating the lambs from their dams 24-48 h after birth, short period of suckling and early weaning (Sarican *et al*., 1979).

Suckling durations and methods in lambs also exhibit regional variations. In some enterprises in the Thrace and South Marmara region, lambs are weaned in as short a time as 1.5 months. The most important reason for this is to milk the sheep for longer in order to obtain larger amounts of marketable sheep milk. On the other hand, it is also due to the intensive demand for suckling lambs in these regions. In contrast, in the Eastern Anatolia region, lambs are weaned at 4 months of age (Kaymakci, 2006).

Survival rate, which is a value measured in animals at certain periods, is defined as the ratio of the surviving lambs to those born (Odabasioglu *et al*., 1996b). Survival rate is influenced by factors such as birth weight, type of birth, sex, husbandry and feeding, birth year and season, age or live weight of dam at birth and genotype (Akcapinar and Kadak, 1982; Ariturk *et al*., 1987).

Body measurements are important in terms of providing information regarding the animals morphological structure. Meat yield is closely connected with body size. It is possible to achieve an increase in meat production in sheep farming by using animals of high build, with long, wide and deep bodies as breeding stock (Unal, 2002).

This study aimed to investigate the growth, survival rate and some body measurements of Awassi lambs weaned at different periods and determine the ideal age for weaning Awassi lambs, which are grown in Erzurum, Turkey and the surrounding area.

MATERIALS AND METHODS

This study was conducted at Ataturk University, Faculty of Agriculture, Research and Application Farm in Erzurum, Turkey. Eighty Awassi lambs born to dams aged 2-6 were used as animal material. In the feeding of lambs, the ingredient composition and chemical composition of the concentrate fed in addition to the pasture is shown in Table 1.

Table 1: Ingredient composition of concentrate (%)

Ingredients	Rate in concentrate
Barley	65.0
Soybean meal	22.5
Wheat bran	10.0
DCP	1.0
Salt	0.5
Premix (*)	1.0
Chemical composition of concentrate (%)	
Dry matter	90.0
Crude protein	15.3
Crude fibre	6.5
Ash	4.3
Ether extract	2.0
N free extract	61.9

*: For kg, 7,000,000 I.U. Vitamin A, 1,000,000 I.U. Vitamin D3, 30,000 mg Vitamin E, 50,000 mg Mn, 50,000 mg Zn, 50,000 mg Fe, 10,000 mg Cu, 8,000 mg I, 200 mg Co, 150 mg Se and 100 mg Mg

The lambs were weighed within the first 12 h following birth using scales sensitive to 10 g and numbered with temporary numbers. The lambs birth dates, birth weights, birth types and sex were recorded.

In the study, lambs were weaned at the age of 45 days in group I (n = 24); 60 days in group II (n = 31) and 75 days in group III (n = 25). Live weight measurements were taken initially on day 45 after birth and afterwards these weighings were repeated at 14 days intervals. Weighings of the lambs were performed in morning hours and on an empty stomach. The live weights of the lambs were measured using precision scales sensitive up to 100 g. Five female lambs were used from each group for the purposes of determining the body measurements.

During the course of the study, group feeding of the lambs was practiced. Weaned lambs were separated from their dams and taken to the pasture and were fed concentrated feed in the evenings in addition to the pasture, 1.5% of their total weight per day for the first 6 weeks and 2% in the later periods (Macit *et al*., 1998).

Survival rate in lambs was calculated as the ratio of the number of living lambs up to day 45, 60, 75, 120 and 210 (end of pasture) to the number of lambs born, taking into consideration environmental factors such as genotype, age of dam, birth year, sex and type of birth.

Body measurements were taken from 5 female lambs selected from each group on day 60, 120 and 210. Withers height, rump height, ridge height, body length, chest width, chest depth and chest girth were measured as body measurements. When taking the body measurements; height, length and depth measurements were taken using a measuring stick; whilst girth measurements were taken using a tape measure (Akcapinar, 2000).

SPSS software package (SPSS, 2002) was used in the statistical analysis of the data obtained in the study and Duncan's multiple comparison tests were conducted to check the differences between the least squares averages sbelonging to the sub groups of observed factors.

RESULTS AND DISCUSSION

This study aimed to investigate the effect of weaning at various ages (45, 60 and 75 days old) on growth, survival rate and body measurements in Awassi lambs. To this end, live weights and daily live weight gains in lambs were studied between birth, 45, 60, 75, 120 and 210 days old and the results are shown in Table 2 and 3.

In Awassi lambs weaned at various ages, in groups I-III, average birth weights were 4.29, 4.53 and 4.46 kg; 45 days live weight 11.55, 11.39 and 11.39 kg; 60 days live weight 13.18, 13.50 and 14.49; 75 days live weight 14.46, 15.25 and 17.29 kg; 120 days live weight 19.22, 21.62 and 23.65 kg; 210 days live weight 30.81, 35.15 and 36.68 kg, respectively. On examining Table 2, it is seen that except for day 210, there is not any significant difference between the groups in terms of live weights. It was identified that the group weaned at 45 days old had a significantly ($p<0.05$) lower live weight on day 210 compared to the other two groups. In terms of observed environmental factors, it was determined that the effect of the age of the dam was insignificant in all periods that type of birth was very significant ($p<0.01$) in favor of singletons except for day 120 that sex was significant ($p<0.05$) at birth and days 60, 75 and 210 and very significant ($p<0.01$) at day 120 and that the linear effect of the birth weight was very significant ($p<0.01$) in all observed periods.

Table 2: Average live body weights of Awassi lambs weaned at different months (kg)

		Live weights ($X\pm S_x$)					
Production traits	N	Birth weight	45th day weight	60th day weight	75th day weight	120th day weight	210th day (Final weight)
Group	ns	ns	ns	ns	ns	*	
1	24	4.29±0.140	11.55±0.450	13.18±0.534	14.46±0.672	19.22±0.840	30.81^{b}±1.021
2	31	4.53±0.133	11.39±0.428	13.50±0.508	15.25±0.640	21.62±0.800	35.15^{a}±0.974
3	25	4.46±0.136	11.39±0.437	14.49±0.519	17.29±0.653	23.65±0.817	36.68^{a}±0.995
Age of dam	ns	ns	ns	ns	ns	ns	
2	8	4.35±0.220	12.19±0.707	14.96±0.839	17.48±1.051	22.77±1.320	36.17±1.614
4	36	4.23±0.120	11.10±0.386	13.43±0.458	15.31±0.576	21.29±0.721	34.64±0.878
5	12	4.49±0.188	11.23±0.606	13.71±0.719	15.94±0.905	22.18±1.132	34.18±1.384
6	24	4.50±0.139	11.75±0.448	13.58±0.532	15.38±0.670	20.73±0.837	32.95±1.021
Type of birth	**	**	**	**	ns	**	
Single	58	4.80±0.068	12.65±0.293	15.03±0.347	17.16±0.437	23.09±0.546	35.62±0.666
Twin	22	3.52±0.125	8.74±0.492	10.88±0.584	12.51±0.735	18.19±0.919	31.46±1.125
Sex	*	ns	*	*	**	*	
Male	44	4.57±0.104	11.61±0.334	13.89±0.397	17.16±0.499	21.88±0.625	35.85±0.761
Female	36	4.29±0.119	11.26±0.383	13.59±0.454	15.38±0.572	21.25±0.715	32.70±0.871
Regr. (Lin.)							
Birth weight			1.363±0.768**	1.49±0.386**	1.496±0.474**	2.278±0.600**	2.851±0.721
Total	80	4.58±0.768	11.58±2.520	13.95±2.721	15.97±3.301	21.54±4.172	34.44±5.192**

Ns: not significant ($p>0.05$), *: $p<0.05$, **: $p<0.01$, Means values with different letters are significantly different at $p<0.05$

Table 3: Average daily weight gains of Awassi lambs weaned at different month (g)

		Daily weight gains ($X\pm S_x$)							
Production traits	N	45th day	60th day	75th day	120th day	210th day (final weight)	45-210th day	60-210th day	75-210th day
Group		Ns	Ns	Ns	*	*	**	**	*
1	24	165±10.1	151±9.7	138±9.6	126±7.6^{b}	127±5.6^{b}	116±5.6^{b}	117±5.6^{b}	122±6.1^{b}
2	31	156±9.3	152±8.3	145±8.7	144±6.6^{a}	146±4.4^{a}	143±5.1^{a}	143±5.7^{a}	148±5.4^{a}
3	25	158±9.4	170±8.6	173±8.5	161±6.7^{a}	154±4.7^{a}	153±5.3^{a}	147±5.2^{a}	145±5.7^{a}
Age of dam		ns	ns	ns	ns	ns	ns	ns	ns
2	8	178±15.2	180±13.5	177±14.2	155±10.2	152±7.6	145±8.6	140±8.6	139±9.6
4	36	153±8.1	154±7.2	145±7.6	145±6.7	145±4.7	142±4.2	140±4.1	146±5.1
5	12	153±13.4	156±12.6	155±12.5	149±9.6	142±6.5	138±7.7	136±7.3	136±7.4
6	24	165±9.6	154±9.5	147±9.8	136±7.5	136±5.7	128±5.6	128±5.7	131±6.5
Type of birth		**	**	**	**	*	ns	ns	ns
Single	58	180±6.5	174±6.7	168±6.7	154±4.7	148±3.6	138±3.6	136±3.6	138±4.6
Twin	22	114±10.3	122±7.6	119±10.5	122±7.6	133±5.7	137±6.7	136±6.1	141±6.7
Sex		ns	ns	*	ns	*	ns	ns	ns
Male	44	160±7.6	158±6.5	155±6.4	146±5.6	150±3.7	146±4.7	145±4.6	148±4.9
Female	36	159±8.5	158±7.6	150±7.2	143±6.8	136±4.8	129±4.5	127±4.1	129±5.1
Regr. (Lin.)									
Birth weight	-	-	-	-	0.011±0.005*	0.009±0.003*	0.009±0.004*	0.011±0.004**	0.010±0.0004
Total	80	159±4.3	159±2.4	153±8.5	143±9.5	143±2.9	138±1.1	136±5.3	145±2.5

*Ns: not significant ($p>0.05$), *$p<0.05$, **$p<0.01$, Means values with different letters are significantly different at $p<0.05$

Whilst the age of dam not making a significant difference in terms of the growth traits of the lambs is similar to the findings of many researchers (Altin and Celikyurek, 1996; Odabasioglu *et al*., 1996a; Gokdal *et al*., 2006; Corekci and Evrim, 2001; Esenbuga and Dayioglu, 2002), there are also, reports indicating that the growth of lambs may exhibit variations according to the dam ages (Cengiz *et al*., 1998; Unal, 2002). In lambs, type of birth having an effect on the growth of lambs exhibits similarities with the findings of many researchers (Tekin and Akcapinar, 1994; Odabasioglu *et al*., 1996a; Cengiz *et al*., 1998). In the present study, the sex of the lamb being found to be significant in various growth periods exhibits similarities to the findings of many researchers (Odabasioglu *et al*., 1996a; Cengiz *et al*., 1998; Esenbuga and Dayioglu, 2002; Gokdal *et al*., 2006).

Unal (2002) reported the birth weight as 4.39 kg in Akkaraman lambs; Esenbuga and Dayioglu (2002) as 4.17 kg in Awassi lambs; as 4.11 kg in Akkaraman lambs; Gokdal *et al*. (2006) as 4.68 kg in Karakas lambs; Dikmen *et al*. (2007) as 4.31 kg in Awassi lambs and stated that type of birth and sex affected birth weight, that the birth weight was higher in males compared to females and in singletons compared to twins. Whilst the birth weights reported in almost all of the above studies for similar and different genotypes exhibit parallels to the results obtained in the present study; results from present study were higher than the values reported by Aksakal (1998) as 2.6 kg in Morkaraman lambs; Ozcan *et al*. (2001) as 3.58 kg in Kivircik lambs; Emsen and Yaprak (2004) as 3.34 kg in Awassi; Yardimci *et al*. (2009) as 3.8 kg in Akkaraman lambs and Lacin and Aksoy (2003) as 3.7 kg in Morkaraman lambs.

The 45, 60, 75, 120 and 210 day live weights found in lambs in the present study, whilst exhibiting similarities with the values reported for 45, 60 and 75 day live weights, in the correct order, by Lacin and Aksoy (2003) as 8.02 kg, 11.26 kg and 12.85 kg in Morkaraman lambs; Kul and Akcan (2002) as 10.02, 11.53 and 12.70 kg in the same breed of lambs; Altin *et al*. (2003) as 8.75, 10.13 and 12.33 kg in Kivircik lambs; Cengiz *et al*. (1998) as 11.78, 13.55 and 15.95 kg in Karakas lambs; Ozbey and Akcan (2003) as 9.46, 11.62 and 14.25 kg in Morkaraman lambs; were lower than the values reported by YardImcI *et al*. (2009) as 13.0, 15.4 and 17.8 kg in the same breed of lambs; Odabasioglu *et al*. (1996b) as 13.38, 17.42 and 20.67 kg in Akkaraman lambs; Akcapinar (1983) as 11.95, 15.66 and 18.41 kg in Morkaraman lambs. Furthermore, the day 120 and 210 (end of pasture) live weight values determined in the present study were lower than the values (30.4 and 39.12 kg) reported for the same breed (Dikmen *et al*., 2007). It would not be incorrect to indicate differences in farming systems as the reason for this lowness.

On looking at the development of lambs in the study (Table 3), the Daily Live Weight Gain (DLWG) in the three groups on days 45, 60, 75, 120, 210, 45-210, 60-210 and 75- 210 were 165, 156, 158 g; 151, 152, 170 g; 138, 145, 173 g; 126, 144, 161 g; 127, 146, 154 g; 116, 143, 153 g; 117, 143, 147 g; 122, 148, 145 g; 116, 143, 153 g; 117, 143, 147 g and 122, 148, 145 g and in terms of the differences between the groups, the days 210 and 75-210 DLWG were significant ($p<0.05$) and days 45-210 and 60-210 DLWG were very significant ($p<0.01$). In terms of the significance test of other sub factors, age of dam was identified as insignificant; the effect of type of birth as significant ($p<0.05$) on day 210 DLWG and as very significant ($p<0.01$) on day 45, 60, 75 and 210 DLWG; sex as significant ($p<0.05$) on day 75 and 210 DLWG and the linear effect of birth weight as significant ($p<0.05$) on 120 days DLWG and very significant ($p<0.01$) on 210, 45-210, 60-210 and 75-210 DLWG. The day 75 DLWG occurred as 182, 224 and 215 g in the groups, respectively and no difference could be identified between the groups. The values identified were on average 159, 148, 150, 141, 130, 134 and 123 g higher than the values reported by Cengiz *et al*. (1998) in Karakas lambs for day 45, 60, 75, 120, 45-120, 60-120 and 75-120 DLWG. In the study, it was identified that the linear effect of the birth weight caused a significant difference ($p<0.05$) in the day 120, 210, 45-210 and 75-210 DLWG and a very significant difference ($p<0.01$) in the day 60-210 DLWG. The values related to the survival rate in lambs are given in Table 4. Accordingly, the day 45, 60, 75, 120 and 210 survival rates in the groups were identified as 70.4, 85.2, 87.9%; 70.4, 85.2, 87.9%; 70.4, 85.2, 87.9%; 61.2, 85.2, 87.9% and 61.2, 82.2, 87.9%, respectively. The difference between the groups was found to be significant ($p<0.01$) on day 120 and 210. The survival rate in the group weaned at 45 days old was found to be significantly lower than that in the group weaned at 60 and 75 days old. The identified values were found to be lower than the values reported by Akcapinar and Aydin (1984) in Morkaraman lambs on day 45, 60, 90 and 150 as 96.2, 96.2, 95.5 and 93.2%; Aksakal (1998) in Morkaraman lambs on day 75, 90 and end of pasture as 1.02, 86, 1.02%; Ozcan *et al*. (2001) in Kivircik lambs on day 30, 60, weaning and day 120 as 100, 96.3, 96.3 and 94.5%. It is thought that this difference may be due to the regional conditions and farming differences.

For the purposes of analyzing, the body measurements of female lambs were taken on days 60, 120 and 210 and results are shown in Table 5. Whilst group III lambs had higher values in terms of body measurements on days 60 and 120 compared to group I and group II lambs, they left their superiority in this respect to group II lambs on the 7th month. This superiority was

Table 4: Survival rate of Awassi lambs weaned at different months (%)

		Survival rate ($X \pm S_x$)				
Production traits	N	45th day	60th day	75th day	120th day	210th day
Total	97	85.0±6.3	85.0±6.3	85.0±6.3	82.0±8.2	81.0±9.1
Group		ns	ns	ns	*	*
1	24	70.4±7.3	70.4±7.3	70.4±7.3	61.2^{b}±7.3	61.2^{b}±7.7
2	31	85.2±7.5	85.2±7.5	85.2±7.5	85.2^{a}±7.5	82.2^{a}±7.9
3	25	87.9±7.6	87.9±7.6	87.9±7.6	87.9^{a}±7.7	87.9^{a}±8.0
Age of dam		ns	ns	ns	ns	ns
2	8	73.3±11.8	73.3±11.8	73.3±11.8	73.3±11.9	73.3±12.4
4	36	93.5±6.8	93.5±6.8	93.5±6.8	84.4±6.8	84.4±7.2
5	12	72.2±9.9	72.2±9.9	72.2±9.9	72.2±10.0	72.2±10.4
6	24	76.2±7.2	76.2±7.2	76.2±7.2	76.2±7.3	72.1±7.6
Type of birth		**	**	**	**	**
Single	58	87.5±5.1	87.5±5.1	87.5±5.1	87.0±5.2	87.0±5.4
Twin	22	70.2±7.6	70.2±7.6	70.2±7.6	62.5±7.7	59.9±8.0
Sex		*	*	*	ns	ns
Male	44	86.1±5.8	86.1±5.8	86.1±5.8	79.9±5.8	77.7±6.1
Female	36	75.6±6.4	75.6±6.4	75.6±6.4	75.6±6.4	75.6±6.7

Ns: not significant (p>0.05); *p<0.05, **: p<0.01; Means values with different letters are significantly different at p<0.05

Table 5: Body measurements of Awassi lambs weaned at different months (cm)

	60th day						
Groups	N	I ($X \pm S_x$)	N	II ($X \pm S_x$)	N	III ($X \pm S_x$)	p-value
Observed Measurements (cm)							
Withers height	5	61.70±2.40	5	64.10±6.30	5	64.10±5.40	ns
Rump height	5	61.00±3.10	5	63.40±3.55	5	62.80±2.60	ns
Ridge height	5	62.00±1.60	5	64.90±2.56	5	64.60±3.10	ns
Body length	5	64.20±7.15	5	70.80±2.28	5	68.60±5.40	ns
Chest width	5	19.80±2.19	5	22.90±1.65	5	22.90±3.69	ns
Chest depth	5	25.20±3.34	5	27.00±3.16	5	27.10±3.39	ns
Chest girth	5	80.60±11.7	5	82.40±2.58	5	83.30±10.37	ns
	120th day						
Withers height	5	63.20±3.70	5	63.20±2.58	5	65.50±5.70	ns
Rump height	5	62.50±2.70	5	62.40±2.70	5	63.90±5.27	ns
Ridge height	5	65.30±3.19	5	64.20±2.59	5	66.40±4.82	ns
Body length	5	68.60±4.09	5	70.20±3.76	5	70.80±2.94	ns
Chest width	5	21.90±3.69	5	22.40±1.08	5	22.40±3.04	ns
Chest depth	5	27.10±3.39	5	29.60±1.52	5	29.00±2.82	ns
Chest girth	5	83.80±10.37	5	83.00±10.46	5	86.60±7.46	ns
	210th day						
Withers height	5	65.80±3.03	5	67.30±3.34	5	65.60±4.21	ns
Rump height	5	64.80±4.02	5	66.00±3.08	5	64.60±4.21	ns
Ridge height	5	66.60±3.76	5	68.00±3.74	5	67.20±3.96	ns
Body length	5	65.50±6.02	5	69.90±4.15	5	68.10±4.50	ns
Chest width	5	23.30 ± 2.70^{b}	5	28.40 ± 2.16^{a}	5	25.60 ± 2.98^{a}	*
Chest depth	5	29.70±4.32	5	30.90±2.60	5	32.00±3.08	ns
Chest girth	5	94.80±12.75	5	106.80±10.09	5	101.80±10.56	ns

Ns: not significant (p>0.05), *p<0.05, Means values with different letters are significantly different at p<0.05

found to be significant only on day 210 in the chest width characteristic (p<0.01). In the study, the withers height, rump height, ridge height, body length, chest width, chest depth and chest girth values calculated for the groups in Awassi lambs were found to be in the same order, 48.00, 45.27, 47391, 45.18, 15.82, 20.45 and 63.36 cm; 63.10, 6090, 62.70, 63.40, 24.80, 30.00 and 98.20 cm higher than the values determined by Kul and Akcan (2002) for the same breed at the ages of 3 and 12 months.

Utilization of feed: The rate of feed utilization in Awassi lambs weaned at various durations, in other words, the amount of concentrate they consume in addition to the pasture for 1 kg of live weight gain for group I-III was 3.48, 3.02 and 2.88 kg, respectively. Similar to the results obtained, Darcan and Guney (1996) found the feed utilization as 4 kg in Assaf lambs milked and farmed using various methods and weaned and put on feed at the age of 60 days and Macit and Aksoy (1996) found the concentrate amount consumed in addition to the pasture for 1 kg live weight gain as 4.65 and 4.04 kg in Morkaraman and Awassi lambs weaned at the age of 54 days, in the feed they continued for 107 days in intensive conditions by giving concentrate of 2% of their live weights in addition to the pasture.

CONCLUSION

The lambs weaned at 60 and 75 days showed a superior performance in terms of live weight and live weight gain and survival rate compared to the lambs weaned at 45 days. On evaluating, the results obtained from the study in general; it may be said that the most suitable age for weaning in Awassi lambs, taking into account live weight gains and survival rates, is 60 days.

REFERENCES

Akcapinar, H. and R. Kadak, 1982. Comparative studies on the survival ability and growth of Redkaraman and Kangal-Akkaraman Lambs. Firat Univ. J. Fac. Vet., 7: 203-212.

Akcapinar, H., 1983. Die einflusse einiger einflussfaktoren auf die Wachstumfähigkeiten von Lämmern der Akkaraman-und Morkaramanschafrassen. Ankara Univ. J. Fac. Vet. Med., 30 (1): 183. http://www.ankara.edu.tr/kutuphane/Veteriner_Web_HTML/veteriner1983_1.pdf.

Akcapinar, H. and I. Aydin, 1984. Survival rate and growth of Redkaraman in the semi-intensive conditions on private farms in Erzurum. Ankara Univ. J. Fac. Vet. Med., 31: 128- 136.

AkcapInar, H., 2000. Sheep Breeding. Renewed. 2nd Edn. Ismat Matbaacilik. ISBN: 975-96978-1-5. Ankara.

Aksakal, V., 1998. Reproduction and flock production characteristics of purebred and resiprocal crosses ewes of Morkaraman and Tushin breeds and growth performance of their lambs. Msc Thesis, Ataturk Univ. Graduate School of Natural and Applied Sciences, Erzurum. http://tez2.yok.gov.tr/fmi/xsl/tez/listevedetay_liste.xsl?-db=TezVT&-lay=web_arama&-max=20&-token.error=liste.xsl&AdSoyad=Vecihi%20Aksakal&-find=&-token.d=1.

Altin, T. and H. Celikyurek, 1996. The effects of feeding residuelmilk on growth performance of lambs. Yuzuncu Yil Univ. J. Agric. Sci., 6 (2): 35-49. IDS: 1308-7584.

Altin, T., O. Karaca and I. Cemal, 2003. The effect of weaning age on growth of lambs and milk production of Dam. Yuzuncu Yil Univ. J. Agric. Sci., 13 (2): 103-111. IDS: 1308-7584. http://web.adu.edu.tr/akademik/icemal/Papers/25-Sutten%20Kesim%20Yasinin-YYU.pdf.

Ariturk, E., H. Akcapinar, M. Aydogan and S. Bayrak, 1987. Improvement with the crossing of the Karayaka sheep breed. Doga TU Vet. Anim. Sci., 11: 1-6.

Cengiz, F., T. Aygun, M. Demirel, H. Celikyurek, O. Gokdal and S. Yildiz, 1998. Effect of various ages of weaning on milk production of ewes and growth of lambs in Karakas sheep. Agriculture Congress of Eastern Anatolia. September 14-18, Erzurum, pp: 959-968.

Corekci, G.S. and M. Evrim, 2001. Comparative studies on the production performances of Chios and Imroz sheep kept under semi-intensive conditions I. Fertility Rate, Survival Rate and Growth of Lams. Turk. J. Vet. Anim. Sci., 25: 421-429. IDS: 1303-6181. http://journals.tubitak.gov.tr/veterinary/issues/vet-01-25-4/vet-25-4-2-9905-1.pdf.

Darcan, N. and O. Guney, 1996. Effects of different milking and rearing methods on lactation performances of Ewes, growing and fattening performances of lambs. National Animal Congress. September 18-20, Izmir, pp: 275-279.

Dikmen, S., I.I. Turkmen, H. Ustuner, F. Alpay, F. Balci, M. Petek and M. Ogan, 2007. Effect of weaning system on lamb growth and commercial milk production of Awassi dairy sheep. Chez. J. Anim. Sci., 52 (3): 70-76. http://www.journals.uzpi.cz/uniqueFiles/00113.pdf.

Emsen, E. and M. Yaprak, 2004. The effects of vitamin E + Se and exogenous hormone treatments on fertility of Awassi and Redkaraman ewes, growth and viability of Their Lambs. Fourth National Animal Congress, Isparta, 1/68-74.

Esenbuga, N. and H. Dayioglu, 2002. Effects of some environmental factors on growth traits of Awassi and Redkaraman lambs. Turk. J. Vet. Anim. Sci., 26: 45-150. IDS: 1303-6181. http://journals.tubitak.gov.tr/veterinary/issues/vet-02-26-1/vet-26-1-25-0011-21.pdf.

Gokdal, O., H. Ulker, F. Karakus and F. Cengiz, 2006. The growth traits of Karakas and its Crosses Lambs (F_1) with Ile De France x Akkaraman (G_1) under unlimited suckling regime. J. Biol. Sci., 6 (4): 787-792.

Kaymakci, M., 2006. Sheep breeding. Izmir city Union of Sheep-Goat Breeders Publication Issue 1, pp: 107. Bornova, Izmir. ISBN: 9944-5334-0-8.

Kul, S. and A. Akcan, 2002. Survival ability, growth and some body measurements in Awassi and East Friesian x Awassi Crossbred (F_1) Lambs. J. Uludag Univ. Fac. Vet. Med., 21: 109-114.

Lacin, E. and A.R. Aksoy, 2003. Comparison of growth characteristics of Morkaraman and Tuj lambs in Kars region. Kafkas Univ. J. Fac. Vet. Med., 9 (1): 33-37. http://vetdergi.kafkas.edu.tr/extdocs/9_1/5_7.pdf.

Macit, M. and A. Aksoy, 1996. The comparison of some important production traits of Awassi and Redkaraman Ewes Reared in the Semi-Intensive Conditions at Ataturk University Agricultural Research and Application Farm. Turk. J. Vet. Anim. Sci., 20: 465-470. IDS: 1303-6181. http://journals.tubitak.gov.tr/veterinary/issues/vet-96-20-6/vet-20-6-13-95090.pdf.

Macit, M., N. Esenbuga, S. Kopuzlu, M. Karaoglu, H. Dayioglu and M. Yaprak, 1998. Fattening Performance of Tushin, Morkaraman and Tushin x Morkaraman (F_1) lambs grazed on pasture and supported with concentrate. September 22-25, 2nd National Anim. Congress, Bursa, pp: 379-385.

Odabasioglu, F., M. Kucuk and M. Arslan, 1996a. Growth and survival traits of (Dorset Down x Morkaraman) Redkaraman purebred and crossbred lambs. J. Anim. Res., 6 (1-2): 87-90.

Odabasioglu, F., M. Kucuk and M. Arslan, 1996b. The investigation of survival rate and growth characteristics of Akkaraman, Dorset Down x Akkaraman (F_1) and Dorset Down x Hamdani (F_1) Lambs. Yuzuncu Yil Univ. J. Fac. Vet. Med., 7 (1-2): 18-25. IDS: 1308-7584.

Ozcan, M., A. Altinel, Yilmaz. and H. Gunes, 2001. Studies on the possibility of improving lamb production by Two-way and three-way crossbreeding with German black-Headed mutton, Kivircik and Chios sheep breeds. I. Fertility, Lamb Survival and Growth of Lambs. Turk. J. Vet. Anim. Sci., 25: 687-694. IDS: 1303-6181. http://journals.tubitak.gov.tr/veterinary/issues/vet-01-25-5/vet-25-5-8-0002-26.pdf.

Ozbey, O. and A. Akcan, 2003. Production characteristics of Morkaraman, Kivircik x Morkaraman and Chios x Morkaraman crossbred lambs. I. Growth, Survival Ability and body measures. Kafkas Univ. J. Fac. Vet. Med., 9: 15-21. http://vetdergi.kafkas.edu.tr/extdocs/9_1/15_21.pdf.

Sarican, C., R. Lischka and R. Sonmez, 1979. The effects of milking began with lambing and lamb raising with residualmilk on livability and growth traits of lambs and the ways of increasing of milk production in Ewes. Clearance Report of TUBITAK VHAG-406 Numbered Project, Izmir.

SPSS, 2002. SPSS for Windows Release, 11.5. SPSS Inc.

Tekin, M.E. and H. Akcapinar, 1994. The comparison of Turkish Merino and Lincoln x Turkish Merino (F_1) lambs in growth, fattening and Carcass characteristics at different Slaughter weights. I. Survival rate and growth. Turk. J. Vet. Anim. Sci., 18: 181-188. IDS: 1303-6181.

Unal, 2002. Survival rate, growth characteristics and some body measurements of Akkaraman and Sakiz (Chios) x Akkaraman F_1 lambs. Turk. J. Vet. Anim. Sci., 26: 109-116. IDS. 1303-6181. http://journals.tubitak.gov.tr/veterinary/issues/vet-02-26-1/vet-26-1-17-0010-28.pdf.

Yardimci, M., E. Sengor, E.H. Sahin, I.S. Cetingul and I. Bayram, 2009. Comparison of lamb growth characteristics in diverse genotypes in relation to milk yield of Dams. Turk. J. Vet. Anim. Sci., 33: 45-51. IDS: 1303-6181. http://journals.tubitak.gov.tr/veterinary/issues/vet-09-33-1/vet-33-1-7-0709-18.pdf.